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The Mysore Agricultural Journal

(The Organ of the Mysore Agricultural and Experimental Union)

Vol. XXI] 1942–43 [No. 1

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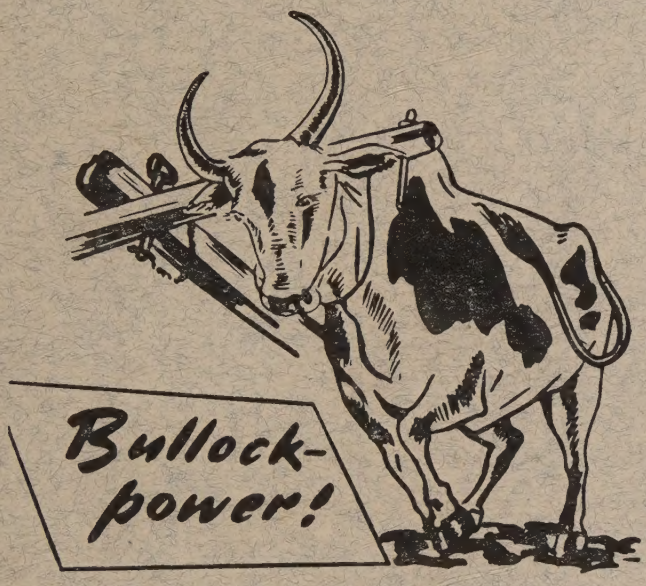

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ERRATA

Table on the opening page, article "Cultivation of Onions": *For* the year 1627-28 please *read* 1927-28.

Acreages against 1933-34 and onwards *to be* as follows:—

1933-34	17,524
1934-35	21,498
1935-36	16,682
1936-37	15,805
1937-38	15,112
1938-39	13,414
1939-40	13,046.

Page 114, 2nd line after the 2nd table: *For* 'During the period 1930 to 1940, the area in Bangalore .....' please *read* 'During the period 1916-30 to 1931-40, the average area in Bangalore .....'.

Page 118, 8th line from the bottom: *For* 'looses' please *read* 'loses'.

Page 122—

3rd line after the table: *For* 'a species of thrip' please *read* 'a species of thrips'. *For 'Thrip tabaci* L.' please *read Thrips tabaci* L.'.

7th line after the table: *For* 'destorting' please *read* 'distorting'.

2nd line, 2nd para after the table: *For* '*Urocystis cerulæ*' please *read* '*Urocystis cepulæ*'.

3rd line, 2nd para after the table: *For* 'These can be controlled' please *read* 'The leaf-spot can be controlled'.

Foot-notes: *For* 'Micologist' please *read* 'Mycologist'.

The Mysore Agricultural Journal

(The Organ of the Mysore Agricultural and Experimental Union)

Vol. XXI] JULY—SEPT. 1942 [No. 1

EDITORIAL

Twenty volumes of our *Journal* have by now been published. We are now in the midst of an intensive food production drive, launched by the Government of Mysore. It will be interesting to recall that in the first volume of our *Journal* in 1919 it was stated, "In the programme of the Government the increase of agricultural production occupies one of the foremost places". Since then the agriculture of the State has developed in several directions and in its own way the *Journal* has mirrored the progress made.

The proposition that tests should be conducted on the raiyats' fields to effectively link up research with agricultural practice has found expression in a large-scale organisation by the Agricultural Department, of Subvention Farms, Demonstration Plots and Seed Farms, during the last few years. These few years also have seen a considerable expansion in the Staff of the Agricultural Department and all the Members of the Mysore Agricultural and Experimental Union know the facility with which they can consult the Circle and Range Officers of the Department for the experiments which they intend to undertake. It is desirable that more members come forward to contribute to the *Journal* for publication the useful results obtained in their fields.

It seems that one or two statements may be properly repeated rom the earliest pages of the Journal. "An Experimental Farm is ne of the last places on which to search for practical instruction n Agricultural Economics. This phase of agricultural investigation s, however, one of paramount importance and such investigations nust in the main, be carried on farms which are being worked solely for the profit of the owner. The keeping of accurate farm accounts and the interpretation of the results of those accounts is a line of investigation, which [our members] should make peculiarly [their]

own". "The business side of farming ... is a most important and profitable line of investigation. The large absentee landlord, the tenant-farmer, either himself farming the whole of his land, or sub-letting part, the part owner, part tenant, the mere wage earners of different degrees of standing, what do these men make out of their business? The different types of farming, arable farming, animal husbandry, the plantations, the dry, wet and garden crop farming, how do these stand as profit-earning propositions? Our members have a practically unexplored field for inquiry and study [here]". From the business point of view the costs of cultivation of certain crops given in this issue of the *Journal* are of interest.

Our grateful acknowledgements are due to the Government of Mysore for their yearly grant, to several of our friends in the mofussil for having enrolled fresh members to our fold and to our contributors.

Service to the Farmer

By

Rajasevaprasakta T. G. Rama Iyer, B.A.

Director of Agriculture, Mysore State

Sir John Russel in his able review of Agricultural Research in India in 1936, drew emphatic attention to the serious defect in the work of Agricultural Departments that the raiyat had benefited very little from years of research. He also pointed out the defects of the methods of transmission of the benefit of research to the raiyat's field.

A systematic attempt was, therefore, made during the last five years to transmit the benefits of research to the raiyat. The most important crop selected by me for the purpose was paddy in respect of which there is an annual deficit in Mysore, ranging from fifty lakhs of rupees to one crore of rupees per annum. A careful examination of the figures of distribution of paddy seed for several years disclosed that the improved varieties of seed distributed covered a ridiculous extent of 2,000 acres as against seven and a half lakhs of acres of paddy in Mysore. The raiyat is certainly alert and is not oblivious of his own advantage in selecting varieties of crops but as he cannot afford risks he waits for proof. That proof has to be given in his field and under his conditions. The following programme of demonstration work was therefore adopted:—

(1) Subvention farms in a leading raiyat's holding to determine the variety best suited to the locality, irrigation source, season, etc.

(2) A very large number of demonstration plots in raiyats' fields to demonstrate the results in the subvention farms.

(3) Seed farms to multiply the variety of improved seed to extend the new variety over a large area and minimise the cost of transport.

The extent of work done in this line during the last five years is given in the following statement:—

Year	Subvention farms	Demonstration plots	Seed farms
1937—38	—	382	—
1938—39	—	824	31
1939—40	4	921	199
1940—41	33	1,253	374
1941—42	145	1,828	962

It is a matter for gratification that the success of the new programme of work has been beyond expectations as indicated by the following statement showing the quantities of seed distributed year after year for the last ten years:—

Paddy seed distribution

	seers.
1931—32	62,619½
1932—33	91,672¾
1933—34	59,865½
1934—35	59,742½
1935—36	67,125
1936—37	25,369¼
1937—38	44,631
1938—39	1,21,331
1939—40	2,64,148
1940—41	3,64,504¼
1941—42	10,38,000 up to 30-6-42 excluding 6,00,000 issued in July and August 1942.

To expedite the results of the new programme of demonstration a regular five-year project was adopted with 21 special Paddy Inspectors with effect from 1939. The progressive result of the five-year project is very gratifying as the figures of seed distribution since the project was started, have mounted in geometric progression. It has also to be remembered that larger distribution of improved seed is effected from raiyat to raiyat and that the departmental sales indicated above only indicate the crops of pure quality.

The growing demand for improved seed is the best proof of its higher yield and value. It should be the aim to increase paddy production by twenty per cent. by extension of improved varieties. This means gradual and persistent work of years but a continued

policy and a method are essential. An attempt has been made in this brief note to set forth the success of the new policy and method during the last five years to indicate the prospects for its continuance in an increasing degree. Demonstration in the raiyat's field is the best service to the farmer which a department can render and the raiyat's happiness is the greatest reward the department can seek.

Long Staple Cotton in Mysore

By

Rajasevaprasakta T. G. Rama Iyer, B.A.
Director of Agriculture, Mysore State

Mysore pays heavily year after year for its deficit in cotton production. The total value of raw cotton, yarn, and Indian piece-goods imported to Mysore every year ranges from one and a half to two crores of rupees. This alarming fact led to strenuous investigations in increasing the production of cotton in Mysore during the last five years. The area of black cotton soil in Mysore is very small, less than one lakh of acres of Asiatic cotton producing barely 12,000 bales a year. The superior cottons, namely, the American and Egyptian, grow in red soils and not in black soils. There are over two million acres of well-drained red sandy loam in Mysore. It occurred to me that the problem of cotton growing in the red soils of Mysore was therefore simply one of finding out the proper season. A statistical experiment to determine the season was therefore laid out with the following astonishing results (see Table).

When so many varieties of cotton with general replications gave concurrent proof of both season and variety the problem was fortunately solved with ease. February to April was the best season to give the highest yield and the raiyat who was late in sowing was punished by nature as actually happened last year. How quick the raiyat is to correct himself is shown by the fact that all the cotton growers have sown from February to April in 1942. The cotton crops of 1942, are according to the growers very good and they have started saying "We tried to avoid cotton but will not part company with it hereafter".

Mean yield of seed cotton in lbs. per acre for twelve seasonal sowings from February 1939 to January 1940 on the Irwin Canal Farm, Mandya

Variety→ / Date of sowing↓	Number of pickings	MA II	CO 1267	X 4383	Cambodia	X 3915	Local Doddahatti	Gadag No. 1	MA IV	CO 2	289 F/38	CN 4–5	289 F/1	Sind Sea Island	Sind B III	Kampala	Busoga
15– 2–1939	17– 6–39 to 9– 9–39 (9)	921·1	879·0	873·7	694·7	679·0	668·4	621·1	605·3	479·0	431·6	373·7	331·6	..	..	..	..
15– 3–1939	25– 8–39 to 22–11–39 (9)	1106·8	991·9	1145·9	744·4	844·5	826·3	782·6	822·4	581·5	805·0	581·2	695·8	..	..	..	..
16– 4–1939	10– 9–39 to 26–12–39 (5)	863·2	868·7	686·6	..	516·8	618·2	600·6	690·0	632·1	764·5	..	711·2	11·6	6·2	..	..
16– 5–1939	6–11–39 to 26– 1–40 (4)	480·6	612·0	406·7	..	348·9	381·9	359·9	360·5	376·9	393·9	..	232·3	19·5	16·3	..	..
16– 6–1939	15–12–39 to 12– 3–40 (5)	739·2	572·7	602·3	..	604·5	532·0	517·9	616·5	514·6	452·7	..	366·6	92·9	43·1	..	..
16– 7–1939	1– 1–40 to 20– 4–40 (5)	598·6	407·5	513·3	..	501·2	372·2	403·7	429·5	338·2	300·3	..	338·2	35·3	3·9	..	..
16– 8–1939	19– 2–40 to 29– 6–40 (4)	354·7	276·8	231·8	..	165·0	296·5	320·6	414·4	242·9	245·1	..	185·8	30·7	11·3	..	..
16– 9–1939	24– 3–40 to 29– 6–40 (3)	251·6	151·3	92·1	..	116·8	212·6	146·9	217·6	141·9	127·5	..	86·1	..	..	89·3	63·8
31–10–1939	1– 5–40 to 7– 7–40 (2)	133·2	114·6	73·7	..	36·7	131·5	98·1	81·2	129·4	82·9	..	52·6	..	..	29·1	48·5
25–11–1939	2– 6–40 to 22– 7–40 (4)	287·4	158·3	212·1	..	122·5	183·6	205·5	172·5	180·3	255·5	..	113·5	..	..	97·2	64·1
23–12–1939	3– 6–40 to 15– 8–40 (5)	241·3	139·7	174·9	..	124·0	..	..	..	..	..	..	..	..	..	..	..
23– 1–1940	4– 6–40 to 15– 8–40 (7)	613·4	590·5	540·0	..	500·6	..	..	..	..	..	..	..	..	..	..	..

The following accurate results of cotton cultivation by the Kalamuddanadoddi Colonists indicate the prospects of the crop in the area:—

Sl. No.	Name of colonist	Area under Co. 4 cotton	Cotton kappas harvested		Amount realised	Yield per acre		Income per acre		
		Acres	Mds.	lbs.	Rs.	Mds.	lbs.	Rs.	A.	P.
1	Mr. G. K. Seetharama Iyengar	5	174	1	696	34	22·6	139	3	2
2	,, K. Byatarangappa ..	5	173	9	693	34	19	138	9	7
3	,, H. S. Venkatachalam ..	5	156	17	626	31	9	125	3	2
4	,, Chamaraju	5	149	18	598	29	26	119	9	7
5	,, N. Thimmappa Gowda ..	4·25	97	15	390	22	27	91	12	3
6	,, Sudarsanachar	3·5	85	14	342	24	12	97	11	5
7	,, B. G. Krishnamurthy ..	3·25	74	21	299	23	0	92	0	0
8	,, S. G. Rangaswamy ..	3	73	26	296	24	18	98	10	8
9	,, Subraya Sastry	2·5	64	16	258	25	23	103	3	2
10	,, T. R. Narasimhamurthy ..	2·5	20	2	80	8	1	32	0	0

1. One Mysore maund given in the statement is 28 lbs.
2. The price in 1941 was Rs. 4 per Mysore Maund. It is Rs. 5 in 1942.
3. The ginning percentage last year was 36·5.

As regards the quality of the cotton grown in the Irwin Canal area it is indicated in the following extract from the Indian Central Cotton Committee's report on staple length of the Indian Cotton crop which is most encouraging:—

Description of cotton	Staple length (32nds inch)	Colour	Feel	Blow-room loss percentage	Spinning capacity	Civil Districts in which grown and Remarks
LONG STAPLE— Over 1 inch.						
(1) p Punjab-American 289-F/K. 25 (including 289-F.)	34	Bright, creamy white	Soft, silky	9	30's warp or 40's weft	Lower Bari Doab Canal colony
(2) p Cambodia Co. 3 and Co. 4	33 to 34	..	..	..	42's/50's warp	Chiefly in Ramnad and Tinnevelly Districts of Madras and *Irwin Canal tract of Mysore State.*

It would be no small surprise to cotton growers in the Irwin Canal area that the cotton against which they shrugged their shoulders in the first year is the best in India.

The experienced cotton growers of the Banavar area have taken to the long staple variety in supersession of the medium staple they were growing. There are now 3,000 acres of irrigated long staple cotton in the Mandya District and 2,500 acres in the Banavar area. It has started extending as a dry crop. This is the most important new aspect of long staple cotton cultivation, namely, its spread as a dry crop. The prospects of its extension are infinite. The solution of the poverty of the Mysore dry farmer lies in long staple cotton. Nature has provided him with well drained soils and it is up to him to benefit himself and the State.

Cigarette-Tobacco

By

Rajasevaprasakta T. G. Rama Iyer, B.A.
Director of Agriculture, Mysore State

Familiarity breeds contempt but in rare cases it commands fear and respect. The former is true of paddy and the latter of tobacco. Paddy is the simplest crop to grow and tobacco the most difficult. Paddy nursery is the easiest to raise and to transplant and after opening the channels you can forget all about it till harvest. Tobacco demands respectful attention and care day by day from seed to sales, every operation being the most difficult and delicate for any agricultural crop. This brief note deals with the problems of tobacco cultivation and curing.

Preparation of Seed

Plants having the largest number of broadest leaves of the best texture, with short internodes, and upward-pointing axils of leaves with a tendency for most leaves to mature together (to economise picking) have first to be selected. The capsules (generally 80 to 100) have to be thinned into 30 or 40 of the plumpiest and healthiest and the seeds have to be picked neither a day earlier nor a day later, as the capsules open and shed the seed when dry. Then the seeds have to be dried and winnowed in blowing contrivances to eliminate light seed. You are prohibited from touching the plant or seed at any stage without washing your hands with a suitable lotion to avoid *mosaic*. Such seed has to be kept in sealed receptacles free from moisture. Just compare this seed preparation with that of paddy.

Nursery

The seed is as small as sand and as light as ash. This tiny seed has to grow in 4 months to a plant taller than a man and yield 16 to 20 leaves weighing one to two pounds. The preparation of the seed bed is the next ordeal. The land has to be dug deep with spades and mixed with sand, the soil has to be sterilized, alternate raised beds and low drains have to be arranged, a liberal dose of organic and artificial manure has to be mixed and the seed bed

prepared with the finest tilth. The seed being light is blown away in the journey from the sowing hand to the seed bed. So mix the seed with sand or ash and sow when the air is still. Then cover lightly with sand. If you bury it, the seed will not germinate. If you cover lightly it gets blown away. Mr. C. V. Ramiah has escaped some of this torture with his patent sowing can. Tobacco seed is held in suspension in water and sowing with the can fixes the seed with water and the distribution of seed in the seed bed is very even as compared with the patchy nurseries sown dry by hand. Mr. Ramiah's method has the further advantage of treating the 'untouchable' as an 'untouchable' by sowing from the can and not with the hand. The seed beds have to be covered lightly with straw. After six days the seeds germinate and then starts the watering ordeal. The tiny seedlings germinating in sand with microscopic roots demand the same delicate care as a new born baby. They want watering several times a day. Too little watering dries the seedling; too much watering brings on debility and disease. It is picturesque to see the rows of women running from end to end with the garden watering can, over the beds. Even the perforations of the nozzle of the water can has to be increased in size with the seedling. If the can is held too low the seedling gets up-rooted. If held too high it pushes it down. In spite of all this laborious care hardy weeds like bulb-grass thrive better than the delicate and tiny tobacco seedling, and weeding is a laborious process to protect the seedlings from being smothered. In the nursery the seedlings are susceptible to more diseases than weak children and want weekly spraying with weak doses of Bordeaux mixture, increasing in strength with the size of the seedling. To keep off borers and leaf-miners, spraying with insecticides is necessary. The seedlings have to be trained to sunlight and gradually to reduced irrigation to harden them for transplantation. They have to be transplanted 42 to 45 days from sowing avoiding lanky seedlings and selecting only stocky ones. The seedlings have to be transplanted in prepared fields, in rows three feet apart either way. Then follows a tiresome process of filling up vacancies unless the transplanting is done with great care. Just imagine what a child's play the paddy nursery and transplanting is as compared with the tobacco nursery.

Cultivation

Tobacco being a delicate plant with succulent roots is very sensitive to weeds. Cultivation and weeding is necessary till the plant is a foot to a foot and a half high. Controlled watering or moderate rainfall is necessary. If the soil is too dry, the plant wilts; if too wet, then too it wilts unless you open drains and aerate the top-soil. By irrigation only the plant does not grow well but gets stunted. A shower of rain has a miraculous effect on growth. At the end of about 2 to 2½ months from transplanting the top-leaves narrow and the beginnings of the spike of buds appear. That is the time to top the plant by removing the flower-spike. Here again too high topping is not of much use and too low topping makes the leaf coarse like country tobacco. Judicious care is required in topping. Topping is not the end of the trouble but the beginning. The plant which has been deprived of its flower-spike by topping exerts its motherly instinct desperately by developing new suckers between the stem and axil of the leaves to develop new flower-spikes to replace the topped spike. These suckers have to be removed again and again, generally three times. Otherwise topping intended to develop the leaf will have the opposite result of stimulating several tops in place of the removed one. At the end of the third month, the leaves mature from bottom upwards. Maturity is indicated by the leaf thickening, becoming brittle and developing resinous gum on the undersurface; faintly yellow specks appear on it.

Harvesting

Even here tobacco is the most difficult crop. Picking is an art on which the entire success of tobacco cultivation depends. Want of care in picking makes all the difference between first-grade tobacco valued at 12 annas a pound and dark-green or dark-brown valued at four pies per pound. If you pick the leaf slightly on the green side you get the greenish grades on curing. If you pick more on the yellow side, you get the brownish grades on curing. The ideal leaf for picking is the one which is greenish with just traces of yellow specks appearing as though underneath the green. Such leaf is capable of giving the best result in curing. And in spite of all the care you are at the mercy of Nature. If the season is too dry there will not be sufficient sap in the leaf to give a good result on curing. The tendency will be to sponge and become brownish and get scorched at the edges on curing. If the season is too wet, drying mid-rib bone-dry requires great care.

Curing

Curing is an art requiring intelligence, judgment and experience. The best leaf can be spoilt by bad curing. Though Ragland's formula of (*i*) yellowing at 90° F. for 24 to 30 hours, (*ii*) fixing colour for 15 hours from 95° to 125° F. with ventilation, and (*iii*) drying mid-rib for 48 hours at 125° F. to 165° F., is generally a safe one; experience indicates suitable changes according to maturity of leaf, moisture in the leaf, atmospheric humidity, etc. It is not possible to lay down hard and fast rules about temperature, ventilation duration, etc., of curing. This has to be left to an intelligent and experienced curer's judgment, the result of mistakes and successes in a curing career. Curing requires frequent watching and attention day and night. In large-scale work seasonal variations often cause a flood of mature leaf in a day, when your barn space is suited only to a gradual stream of mature leaf. Occasionally, it would be useful and may become necessary to resort to other methods such as Ragland's hastened curing by sweating the leaf, *i.e.,* raise leaf to 120° F. to start with in a couple of hours, lower the temperature in a couple of hours to 95° F., and then proceed from fixing colour. This saves about 15 to 20 hours in the total duration. Mr. C. V. Ramiah has successfully adopted this, but it is not a safe process in the hands of a routine curer with whom Ragland's original formula is much the safer one. Acetyline curing has also been very successful in seasons when there is not sufficient atmospheric humidity for curing (*i.e.,* when the dry bulb thermometer shows a difference of more than 15° or 20° above the wet bulb, the optimum being 7° above it). Four dishes with carbide and water at the four corners and one at the centre with occasional renewals for 40 hours without fire effects very good yellowing and the rest of the curing taking only another 50 hours. Mr. C. V. Ramiah has been quite successful in dozens of curings with this method. His latest method of loading 9,000 lb., *i.e.,* twice the usual load, increasing ventilation to counteract the evil effects of over-loading, greatly economises fuel. I got the results of this method graded side by side with the usual method with the following result:—

Comparative Statement of Grading Results of Usual and Experimental Curings in the Season of 1942

	Average result of Usual Curings (5,000 lb. load)	Result of Experimental Curings (9,000 lb. load)
I Grade ..	3·5 %	1·8 %
II ,, ..	21·1 %	22·2 %
III ,, ..	27·2 %	31·7 %
IV ,, ..	3·7 %	7·7 %
IV A ,, ..	11·8 %	7·5 %
V ,, ..	14·1 %	16·00%
VI ,, ..	5·9 %	8·5 %
VII ,, ..	0·4 %	Nil
Dark-green ,, ..	0·3 %	Nil
I.C.X. ,, ..	3·6 %	1·2 %
Scrap ..	2·3 %	0·6 %
Damaged ..	3·6 %	1·8 %
Shrinkage ..	2·5 %	1·0 %

Bulking and Grading

A week's bulking in good weather has been found beneficial in yellowing the traces of green in the veins and thus promoting the grade of the cured leaf. Longer keeping under Mysore conditions improves many fourth grade leaves to second, and also improves superior I.C.X to the fourth grade. The only evil effect of keeping long without baling is that the leaf loses the flashy fresh lustre and becomes dull-looking but does not go down in grade under Mysore conditions. Grading is again an art. To one well accustomed to grading, nearly ninety per cent. of leaf is easily graded into the following well-known grades:—

Bright lemon, no blemish ..	.. I
Bright lemon, very slight blemish	.. II
Bright lemon, slightly sponged	.. III
Greenish lemon ..	.. IV
Yellowish green ..	.. I.C.X.
Dark green ..	.. D.G.
Brownish lemon, sponged ..	.. V
Brownish lemon, heavily sponged	.. VI
Dark brown ..	.. VII

Mistakes occur in the border-land between III and V, IV and I.C.X., and V and VI. These mistakes can be rectified only in table-passing and not in line-grading on the floor. Any mistake in grading causes undue loss to one or the other and grading is a skilled operation.

The above brief description shows how difficult and skilful tobacco cultivation is from seed to sale. After everything is over the buyer starts examining whether the leaf has body, is silky in texture and has mild neutral flavour, looks at the proportionate weight of leaf to mid-rib, flashiness of colour, colour of the ash, burning quality, etc. ' No crop demands such constant care, skill and attention as tobacco. No wonder the illiterate paddy grower of Mandya prefers a paddy crop of less value to tobacco, with his shortage of labour and languor from malaria. But the more intelligent and active raiyat finds scope for his intelligence, and return for all the skill and attention he is capable of, which finds no return in a routine matter of course food crop like paddy. The Goribidanur raiyat is sportive and says, "never mind the mildew once in a way. I will plough down the crop. If God gives rain next year I shall be happy; you will have plenty of my tobacco". Fifty per cent. I to III grades when you open the door of the barn after curing is ample compensation for all the troubles. The very sight cheers up everyone. No wonder Sir John Russel remarked that one who can grow tobacco well is up to growing any crop. The successful tobacco grower is a combined Botanist, Chemist, Mycologist, Entomologist, what not!

From the above brief description it should be easy to follow why it takes years to develop the Cigarette-tobacco industry with an illiterate raiyat population. Every day's work and every operation from seed to sale requires careful training. Nursery, cultivation, picking, loading, curing, grading, everything requires training and concentrated diligence after training. No operation can be postponed by even an hour to suit man's love of ease. The nursery labour has to be trained; the grower has to be trained; the harvester, the curer, the grader, all have to be trained and have to be vigilant.

Of all these the lot of the professional curer who purchases leaf is the most unenviable. If the curer is too strict about quality of green leaf and rejects too much leaf, the grower waxes in anger and will refuse to grow tobacco again. The grower squeezes money from him on the one side and the buyer squeezes him down on the other. If he is slack in insisting quality of leaf the curer gets punished at the hands of the grader. He is the surety of the grower to the buyer. With all these troubles the curer who opens the barn after curing and finds fifty per cent. I to III grades, finds enough cheer and money to remunerate him for all his troubles. Planting in May, curing in August and grading in September can give you that cheer and profit.

Potato in Mysore

By

K. Gopala Iyengar and R. S. Aiyengar

The cultivation of potatoes as a cash crop, is a well-established practice in a few portions of the State. The area under this crop is very small, fluctuating between five to six thousand acres in recent years. In 1926–27 nearly ten thousand acres were under potatoes, but this acreage has recently diminished. Expansion of cultivation in the adjoining Presidency of Madras, and the loss of export market due to foreign competition, have been responsible for the diminution of the area under this crop. The present war conditions have considerably stimulated the local production and market. But this advantage has been offset, by the enhanced price of fertilizers and the difficulty experienced in obtaining adequate seed supplies.

During the period 1915–20, the average area under potatoes in Mysore, was 4,400 acres. This increased to 5,200 acres in 1920–25 and subsequently expanded to 7,400 acres during 1925–30. The years 1930–35 saw a reduction of this area to 4,400 acres. Recent years have again witnessed an expansion of potato cultivation, the average for the years 1935–39, being 6,600 acres. The limits between which the area under potatoes has fluctuated in the past twenty-five years is represented by 3,726 acres in 1922–23 and 9,556 acres in 1926–27.

Nearly eighty per cent. of the area under this crop is situated in the two districts of Bangalore and Kolar, being confined to holdings easily accessible by road or rail. In the Bangalore district, Hoskote, Anekal, Bangalore and Devanahalli are the important potato growing areas. The main centres of production in the Kolar District are Chickaballapur, Sidlaghatta, Kolar and Malur. Hassan, Kadur and Tumkur districts contribute to the remaining acreage, approximately twenty per cent.; Hassan being more important than the rest.

The average rainfall in the potato tract is nearly thirty inches, most of it being received from May to the middle of November. The range in temperature is fairly equable, that in summer ranging from seventy to hundred degrees Fahrenheit. The winters are comparatively mild, the temperature usually ranging between fifty-five to

seventy-five degrees F. The soil is generally a deep red loam, the raising of potatoes being prevalent on the lighter portions. Occasionally, as under old tank beds, the crop is raised on heavier soils, which contain a large admixture of silt and clay.

In Mysore, two crops are raised during the year, a summer crop and a winter one. The summer crop is planted in the period April to June and harvested during August and September. Winter plantings take place during the months of October, November and December, the crop being lifted from January to March. The winter crop is the main crop accounting for nearly 60 per cent. of the total production. The average yield per acre is fairly high, being about 9,500 lbs. or 396 mds. per acre (maund = 24 lbs.). The average yield of the summer crop is about 7,500 lbs. or 312 mds. and that of the winter one 11,000 lbs. or 458 mds. per acre. In addition to its heavier yield, the keeping quality of the winter crop is better than that of the summer one, which comes for harvest during the rainy season.

The crop is usually raised under irrigation, the main supply of water being derived from wells. Water is generally lifted by *picottahs* or *mhotes* and occasionally by power-driven outfits. As the summer crop enjoys the benefit of the pre-monsoon rains and the south-west monsoon, it requires a lesser amount of irrigation than the winter crop. In a few places in Kolar and Kadur districts, the summer crop is raised as a rain-fed crop under old tanks. The returns from such crops are highly uncertain and usually low, rarely exceeding 2,500 pounds per acre.

Mostly early varieties such as *Ricketts* and *Dharwar* with a duration ranging from three to just over three and half months are grown. Of the two, *Ricketts* is earlier being ready for harvest in just over three months. It is a mixture of old English varieties, not definitely identifiable at present. The tubers are of medium size, mostly oval or pebble shaped with a light brown skin, shallow eyes and white flesh. Since the outbreak of the present conflict, seed-stock from Burma, known locally as *Rangoon Ricketts*, has been utilised to a considerable extent. The Burman stock is later than *Ricketts* by about one week and produces larger-sized tubers. *Dharwar* or *Italian White Round* comes of imported Italian stock and requires nearly three months and a half to come to maturity. The tubers are small to medium in size, roundish with a light-brown skin, sunken eyes and pale yellow flesh. *Mountain*, *Great Scott* and *British Queen* are grown to a very small extent. In spite of their

heavier yield they are not popular due to their duration being four months or over. Of the two varieties, *Ricketts* and *Dharwar,* the latter is hardier and more tolerant to diseases. The cooking quality of *Ricketts* is superior to that of *Dharwar,* the consistency of *Ricketts* being granular, whereas that of *Dharwar* is pasty. For earlier plantings, *Ricketts* is commonly preferred whereas late plantings are mostly confined to the variety, *Dharwar.*

Potato is an intensively cultivated crop responding well to adequate manuring. As most of the cultural operations are performed by manual labour the crop is usually raised in small patches rarely exceeding a few acres on any individual holding. Preparatory cultivation of the land commences seven to eight weeks prior to planting. The land is either given a deep ploughing or dug by hoes to a depth of a foot or over and allowed to remain as such for a month or so. The plot is again turned over by hand hoes, the land being worked to a depth of six to eight inches. After a lapse of about a fortnight, farmyard manure at a rate of forty cartloads per acre is spread over the land. The field is splash irrigated and when it attains proper condition, the plot is stirred, levelled and furrowed. The furrows are usually four to six inches deep and a foot apart. Sometimes the farmyard manure is applied to the furrow and stirred lightly. The plot is now marked into long narrow beds, water channels laid and drains provided preliminary to taking up planting.

The seed rate employed is 850 to 1,000 lbs. per acre or 35 to 42 mds. The seed is usually saved by the cultivator from the previous crop or obtained from local dealers. Bulk of the planting material is of local origin. Roughly a tenth of the material planted is obtained from outside, mostly from Dharwar and consists of imported Italian stock. This amount of imported seed which is obtained annually is supposed to keep up the vigour of the seed and prevent it from running out. Seed material is usually preserved in cool rooms, thinly spread on the floor. The imported seed is generally multiplied during summer and used as seed for the ensuing winter crop. Much of this summer planting for seed is found round about Hoskote.

The usual practice is to plant cut tubers. When small entire tubers are used for planting a small notch is made in the tuber. The cutting of seed tubers and their planting is usually performed during cool weather, either early in the morning or late in the evening.

Undue exposure of cut tubers is avoided as much as possible. Fertilizers are usually applied at the time of planting. A very common application is at the rate of one hundredweight of ammonium sulphate and a hundred-weight and half each of concentrated super and sulphate of potash per acre. If the moisture is insufficient for planting, the furrows are given a light irrigation. Sets are planted to a depth of nearly two inches and spaced four to five inches apart in the furrow. In favourable weather the moisture in the plot would last till sprouts are put forth, otherwise one or two light irrigations or hand waterings would be necessary. Sprouts appear two to three weeks after planting. In case the soil has formed a crust at the time of sprouting, the furrows are lightly stirred up by hand. Subsequent to general sprouting, the crop is irrigated at intervals of three to five days. The soil, while always being maintained in a moist condition, is never allowed to get slushy.

Six to seven weeks after planting the plots are dug up and plants earthed up. If necessary the plots are weeded once or twice prior to earthing up. After earthing up, apart from irrigation no other cultural operations are necessary. The crop is usually sprayed with a combined spray of Bordeaux mixture and calcium arsenate, first at the time of earthing up and again a fortnight later to prevent attack by diseases and pests.

The crop is usually dug up as the vines commence to age and die. Irrigation is suspended a week or two before to enable the tubers to harden. The tubers are usually dug up by hand hoes, separated from the vines, and unsound and damaged tubers rejected. Loss due to harvesting operations is generally less than two per cent. as the crop is carefully lifted. The fresh tubers are either spread in a thin layer or made into a heap in a cool situation away from direct sunshine. If the tubers are heaped, the heap is broken up and remade at intervals of two or three days. During this period, the skin of the potato hardens and the dirt adhering to the tubers falls off. About a week after harvest, the crop is ready for transport to the market. The product is usually taken to the market in cartloads, sometimes in sacks. Potato is not systematically rotated with other crops; it generally precedes or succeeds a crop of onions or irrigated ragi.

The cost of cultivation and the returns from this crop vary from holding to holding and it is exceedingly difficult to obtain exact estimates, the table below being only a tentative estimate.

1.	Preliminary cultivation	Rs. 15
2.	Manure and Manuring	„ 25
3.	Seed and Planting	„ 100
4.	Fertilizers	„ 25
5.	Weeding and earthing up	„ 10
6.	Irrigation	„ 40
7.	Harvesting	„ 15
8.	Spraying	„ 10
9.	Assessment and Marketing charges ..	„ 10
	Total cost of cultivation	Rs. 250

Estimated yield per acre 10,000 lbs. or 415 mds.
By sale of tubers at As. 12 per md., Rs. 311–4–0
or say Rs. 310
Less production charges .. „ 250

Net profit from an acre of potatoes Rs. 60

As part of the manure and much of the labour employed in raising the crop is furnished by the farmer, the actual return is bound to be higher than the figure arrived at above.

The main assembling centres in the Mysore State are Bangalore, Whitefield, Chickballapur, Malur and Bowringpet. The bulk of the local production, approximately 55 to 60 per cent., is placed on the export market, the chief market being Ceylon. Formerly the Colombo market used to absorb annually over a lakh and a quarter rupees worth of Mysore potatoes. The export trade favours medium round tubers and is almost exclusively confined to the variety, *Dharwar*. Nearly 65 per cent. of the acreage is under this variety. Local consumption is steadily on the increase, mainly in urban areas. The foremost consuming centres are the cities of Bangalore and Mysore and the mining area of Kolar Gold Fields. The local markets prefer white-fleshed medium tubers and *Ricketts* enjoys great favour. The local consumption accounts for nearly thirty per cent. of the total production and the area under *Ricketts* also amounts to about thirty per cent. of the area under potatoes. About 10 to 12 per cent. of the production is retained by the cultivator for seed and to a small extent for consumption. About 5 per cent. of the area is occupied by other strains like *Mountain, Great Scott* and *British Queen*.

Unlike many products of agriculture, potato does not keep well for long, and results in considerable loss during storage. Consequently in the absence of a steady influx of fresh potatoes into the market, the price of potato is determined by the available supply. The potato price is at its minimum, just after harvest, when supplies are plentiful. As stocks diminish the price rises, till it attains its maximum just prior to the arrival of the next harvest on the market. During the harvest period the price climbs down as the supply increases, till it reaches the minimum. In parts of India, the disparity between maximum and minimum prices is as much as three hundred per cent.

The fact that two crops are raised during a year and the latitude obtained in the time of planting and harvest, has a considerable salutary effect on the price of potatoes in the State. The winter crop which is harvested during January to March ensures abundant supplies to the market till the middle of June. From then onwards till early August supplies are usually low. The summer crop which appears on the market in August maintains supplies till about November. Supplies are low during November and December. In January the next winter crop appears on the market. Potato prices in Mysore generally rule as follows, with January prices as mean.

January and February	100
March	105
April	115
May	135
June	170
July	160
August and September	105
October	125
November	155
December	160

In the recent Report on the marketing of potatoes in India and Burma, the area in Mysore is stated to be 5,700 acres and the total production has been figured at 6,80,700 railway maunds (maund = 82⅔ lbs.). The average yield has been estimated as 119 maunds or nearly 9,900 lbs. which is very near the maximum yields obtained in the State. With an acreage of 6,600 and an average yield of 105 maunds, the total production in the State may be safely estimated as 6,60,000 maunds. It is imperative to raise this total

production to at least a million maunds per year. An increase of the total production can be obtained, either by an expansion of the area under this crop or by bringing about an increase in the yield per acre. The potentialities for an increase of the area may be gauged by a perusal of the accompanying table, which has been compiled from the Mysore Season and Crop Reports.

Area under Potato in Mysore

Season	Bangalore	Kolar	Hassan	Kadur	Mysore and Mandya	Tumkur	Chitaldrug
	Acres						
1917–18 ..	2,500			620			
1919–20 ..		2,358					
1921–22 ..			1,115				
1923–24 ..		2,436	1,070				
1924–25 ..				2,625			
1925–26 ..	2,745						
1926–27 ..		3,101	930		2,777		
1927–28 ..				1,200	2,777		
1928–29 ..	2,558				2,554		1,418
1929–30 ..		2,259					1,642
1930–31 ..	2,668						
1931–32 ..							826
1935–36 ..		2,920	998			1,272	
1936–37 ..		3,189	938	843		773	
1937–38 ..				2,766		945	

Easily the undermentioned area may come under potato in several parts of the State.

Bangalore ..	..	2,750 acres
Kolar ..	..	3,000 „
Hassan ..	..	1,000 „
Kadur ..	..	1,500 „
Mysore and Mandya	..	1,750 „
Tumkur ..	..	1,000 „
Chitaldrug ..	..	1,000 „
TOTAL	..	12,000 acres

Of this 5,000 acres situated in Kolar and Bangalore districts may be considered as the main area. Here the cultivation of this crop is well established and heavy yields are usually assured. The

remaining area may be considered as secondary area, with a normal out-turn of three-fourths of what is usually obtained in the main area. If potato cultivation in the State extends to 12,000 acres, the total production can be safely figured at 10,25,000 railway maunds.

The average yield in the State is fairly high as potato yields go in India. The varieties under cultivation are early ones and these naturally are not heavy yielders. Medium or late varieties resulting in heavier returns are not likely to find favour with the cultivators. Substitution of the varieties under cultivation by fresh ones, which are early and heavier yielding is very necessary. Meanwhile it would be profitable to effect hill selections in the varieties under cultivation for increased yield and specially for securing disease-free seed.

Trial of well-known English varieties have been conducted for several years on the Hebbal Farm, but none of them have been of much promise. During the period 1922-27, thousands of locally obtained seedlings were tried. A few of these seedlings like B.Q. 30, Sel. 284, H. 384, and 5, B.T., were of considerable promise in preliminary trials. These were subsequently discarded due to the prevalence of ring-disease and various other virus maladies.

The toll taken by pests and diseases is of considerable magnitude. The practice of clean cultivation and frequent spraying though widespread is by no means universal. Much propaganda is still necessary to bring home to the cultivator the beneficial effect of these measures. As regards tuber-borne diseases it is necessary to enforce some sort of seed treatment prior to planting. Supply of disease-free seed stock is a prime necessity. Hardly anything is being done at present regarding this. It is very necessary to establish seed farms, which will be in a position to supply the cultivator, certified seed at a reasonable cost. Periodic renewal of the planting material at least once in three years would be very beneficial. In a normal season, the yield is at least diminished a tenth, due to the ravages of pests and diseases.

Equally important gains are secured by generous application of manures. In addition to organic manures, fertilizers play an important role, but unfortunately their use is limited at present due to enhanced price. A very interesting local practice is the application of waste from woollen mills and tanneries as manure, especially on the heavier soils. At a very conservative estimate, the total production can at least be raised by ten per cent. by a more generous application of manures.

Better marketing facilities are of course necessary to the cultivator. If a single agency were to handle the supply of seed, manure, and spray materials as well as credit and marketing facilities, the overhead charges would be at a minimum and the cultivator need be in touch with only a single organisation. Such agencies would be of immense benefit in all important centres of production.

With a possible area of 12,000 acres under potato, the annual production was estimated to be 10,25,000 railway maunds. An increase of ten per cent. in the production can be easily secured by vigorous preventive measures against pests and diseases and by a more extensive application of manures. The revised figure of annual production of potato in Mysore would then stand at 11,27,500 railway maunds.

Some Practical Aspects of Chicken Raising in Mysore State

By

S. B. Vasudeva Rao, L.V.P. (Hons.)
Poultry Special Officer

If poultry farming is to be remunerative, the importance of raising strong and hardy chickens cannot be over-estimated. Although the success of chicken-raising is intimately bound up with the care and management of the parent flock, the handling of hatching eggs and incubation, yet the yearly success or failure of a poultry business itself is determined to a large measure by the skill with which the poultryman raises his young stock.

The selection of hens for the breeding pens has to be given due thought. The baby chicks receive their natural endowment of strength, vigour, type, laying capacity and egg size from their parents. It is possible by careful selection of eggs year after year with definite ideals in view, like vigour, size and number of eggs, to build up a specially disease-free and good laying strain by bearing in mind the simple breeding principle that "like begets like". The pedigreeing of baby-chick is a practice which should be introduced into every progressive poultry farm, as a step in the plan of improvement of poultry industry in the State. Baby-chicks must be obtained every season for replacing adult fowls which will be culled out during the year on the ground of age or other reasons. Each year 50 per cent. of the laying stock will have to be replaced to get the best out of a flock of laying birds, considering that the useful lifetime of a layer in general is only two years. *75 per cent. of the laying stock should be raised every season.*

To keep up the maximum intensity of production in a flock it should comprise of a moiety (50 per cent.) of pullets less than one year old and the other moiety (50 per cent.) of hens below two years of age at any part of the year. Therefore every farm must annually raise over 75 per cent. of the laying flock, to make up for the loss of old birds as well as for sale.

Hatching Season

The season of hatching is a most important consideration in Mysore, as it is in every country. It has been found by experience

that hatching during monsoon, from June to September, has given the best results. The chickens of this season grow twice as fast as those raised later than December. Growth of chicks is much retarded by the summer heat, even as early as February. The new pullets should start laying by mid-February at the latest to escape the devitalizing effect of summer on vegetative growth. Therefore it would be a wise procedure to mate the selected birds in the first week of May and save eggs from the last week of May for the incubators. Six hatches could be taken from each incubator before the end of the season, when most of the layers start moulting. Chickens raised during the monsoon grow fast, mature early, and avoid diseases like roup, pox, and coryza by their natural vitality; the later hatched chickens seldom escape these diseases.

Collection of Eggs for Hatching

Fertile eggs should be collected as often as possible to avoid dead embryos. The embryos germinate if they are in contact for a variable period with the warm bodies of the hens. Subsequent chilling kills such embryos. Hatching eggs should be held at as uniform a temperature as possible, between 50° F. and 60° F., as variations beyond these limits weaken the germ. An open tray of cold water may be placed in the shelf where the eggs are stored as this increases the humidity and reduces the temperature surrounding the eggs. Eggs older than ten days are not fit for incubation and those less than a weak old give the best results. Select fertile eggs with good oval shape, smooth shell texture, and weighing at least 27 ounces to the dozen. When despatching eggs to outside stations adjust such that the consignment reaches the party to enable him to place the eggs into the incubator within ten days of collection.

Hatchery and Yards

The incubation cellar and nursery must be distinctly separated from the general yards, being placed at some good distance from the latter. The servants in the hatchery should not attend to any kind of work in the poultry yards. Baby-chicks catch easily infectious diseases like contagious coryza, pox and coccidiosis, to which adult fowls are either resistant or immune. A neglect of this precaution has resulted in the decimation of the whole lot of baby-chicks on a farm last year, before the source of the carrier was traced to the servants from the yards.

Incubators

The incubators require to be carefully tested by running them for 3 or 4 days prior to the loading of eggs to eliminate any possible trouble in the mechanism during the actual use. Between hatches and before incubators are used certain precautions to safeguard against chick diseases are to be taken. Eggs and moisture trays are to be washed and scrubbed with a good disinfectant and dried before packing them into the incubator. After removal of the chicks ventilate the incubator for 3 or 4 hours by keeping the doors open, spray the interior with a disinfectant lotion like the tropical chloride of lime and dry the parts.

Temperature is a vital factor in artificial incubation. The maker of the incubator is the best guide as regards the maintenance of temperature during the period. A general rule to follow in all hot-water type of incubators is to run them at 102° F. during the first week and 103° F. in the second and third weeks. The temperature rises to 105° F. on the 19th day in all promising hatches, however much may be our attempts to reduce the flame.

When fresh eggs are loaded in the monsoon, the hatch is usually complete by the 20th day of incubation. A hatch must be completed within 24 hours after the first chick is out, and the stragglers are best destroyed, as they will be week chicks.

Moisture has to be carefully regulated in warm weather but during monsoon the air is usually surcharged with water vapour, and one has to merely fill the moisture trays and occasionally examine the air space, till the 19th day, after which it is best to remove the moisture. In case there is doubt as to the sufficiency of moisture dip a rag in water, very warm to touch, and cover up the egg surface for a couple of hours and remove.

Ventilation of the incubator is essential to remove the carbon-dioxide and other gases given off in the process of the embryo development. All ventilated incubators give rise to excess of humidity and accumulation of poisonous gases, thus retarding chick development. In such circumstances, a few openings made at the right place in the incubator adds to its efficiency.

Turning of Eggs

Eggs are to be turned as many times as possible. Experiments in turning have shown that best results are obtained by turning as many as 14 times a day for the first two weeks. Turning 5 times

a day during the first week, thrice during the second week and twice in the third week till the 19th day, is the routine followed on Government Farms.

Finish of the Hatch

As soon as the hatch is complete, the weak chicks, chicks which are not standing squarely on their feet, and chicks which are not well fluffed like a ball of down must all be promptly eliminated. Chicks are toe-punched and wing-banded as a step in pedigreeing work before being placed in the warm brooder.

Brooding

There is no more critical period in the life of a chick than at the time when it is removed from the incubator and starts life under artificial hovers or heaters, which must supplant the mother-hen in its existence.

The regulation of temperature for the first week affording warmth and comfort to the growing chicks is an art all by itself. There is no "fool-proof" device for such an arrangement, and persons of that species are best outside the hatchery. One has to be essentially guided by the behaviour of the chicks under the influence of the warmth, which has to be regulated according to the needs, whatever might be the medium for generating the heat.

A very simple brooder could be constructed in the following way. One galvanised iron sheet of thin gauge made into a form of a truncated cone, with a 42-inch larger diameter and 12-inch perpendicular height. The cone or reflector is painted both inside and outside with aluminium paint. The small end of the cone is blocked by a circular wooden piece, in which there are five small ½-inch holes bored for passing of an electric insulated cord as well as for ventilation purposes. A socket is fixed for an electric bulb at one end of the silk cord while the other is fixed to the plug. An electric bulb is fitted on to the socket and hangs from the reflector, and could be raised or lowered into the shade at will. The reflector or shade is mounted on a framework of flat iron, and has four legs, 4 inches high from the ground, at the wider circumference of the cone. The cone is placed on the ground like an inverted pan resting on the four legs provided with clearance of 4 inches from the ground.

A flannel or a blanket strip, about 5 inches wide, is attached to the large diameter of the shade, such that, it hangs all round the outer edge like bell-tent hanging walls. This strip of blanket has to be slit

across at the interval of 6 inches to permit chicks to emerge out of this "tent" at will. A light guard made of thin galvanised iron sheet, in the form of a square 6 inches high and 5 inches square is placed with the top and bottom open. The metal canopy is now inverted over this guard such that the bulb could be lowered or raised into its middle. When the light is raised to the roof, the chicks could see around for feeding, and when the light is dropped into its middle, the chicks get only the warmth radiated from top and sides. The bedding consists of sand of a 2-inch thick layer, over which cut straw is laid as litter. The hover space required per chick is 7 sq. inches, and a hover with a diameter of 42 inches can, therefore, provide accommodation for 200 chicks. Around the hover at a distance of 6 inches all round is fixed a wire net enclosure, 1 foot high, to prevent chicks straying too far away from the warmth. This is expanded according to the requirement of floor space for the growing chick. The running space required per chick during the first week is 45 inches. Thus a room 10′ × 12′ could accommodate 300 chicks, with a hover of 52 inches diameter in the centre of the room. The chickens are fed outside the hover in special chicken-feed troughs and drinking fountains which are soil-proof.

The Hover Temperature

The hover temperature at the floor level during the first week is 92° F., which may be reduced to 85° F. in the second week, and 80° F. in the third week. Later it would be necessary only during nights. The adjustment of the temperature could be done with a little experimenting with bulbs of different voltage starting with 60 volts in the first week. A good hurricane lantern with the tank buried in the earth may also take the place of the bulb.

Battery Brooding

On Mysore Government farms battery brooders are adopted for raising chickens up to six weeks of age. The battery brooder is a box 2′ × 3′, with wire-net bottom and top. There are twelve circular openings on either of the broad sides and six on one of the narrow sides. These slots permit the chicks to crane their necks outside the brooder, but are not large enough for them to get out. The sides of the brooder are made of thin plywood while the framework is made of deal wood, and legs which are 4 inches long are supported by strips of iron. Three galvanised iron rectangular troughs for

three sides to serve as containers for mash and water complete the equipment of the brooder.

For the day-old chicks, the brooder has to be specially adjusted to conserve heat. A galvanised iron sheet is placed on the floor of the brooder and litter is spread as in the case of the hover. A reflector shade and a holder are fixed to a battan nailed across the middle of the sides of the brooder just below the lid. This arrangement does not interfere with opening or closing of the lid. A coarse blanket cloth or a gunny bag, stuffed thin with straw clippings, is covered over the surface of the lid, while the sides are similarly treated to prevent breeze from the slots. The feeding is arranged inside the brooder in suitable chicken-feed troughs and drinking fountains.

The brooder thus insulated gives the necessary warmth for a week after which the floor is bared exposing the wire net, and the chickens feed outside the brooder through the slots provided.

There are many advantages when such a type of brooder is used, as it saves labour, permits of excellent sanitation, economises space, and handling groups of chickens is made easier.

The wire-net floor made of ¼-inch mesh does not hurt the feet of the chickens but ensures automatic cleaning of droppings. The arrangement to feed the chicks outside the brooder prevents waste of feed by scratching of the chicks, and mixing of the excrements in food and drink which is a prolific source of contagious Coryza. In the hands of a capable poultry man chicks could be raised with the minimum of mortality. For the rural folk, this brooder is a boon as they can easily use the foster-hen confined in the brooder in place of a light. The chicks are protected from kites and crows during the day when shut up in the brooder.

Prevention of Cannibalism and Coccidiosis in Battery-Bred Chickens

However there are a few disadvantages like cannibalism which starts inside the brooders very quickly, and occurrence of Coccidiosis (or bloody diarrhœa) when the chickens are suddenly let to the yards. If the brooders are kept with tops covered up so as to darken the interior after the chicks are a week old, this habit never breaks out. When the chicks are exposed to sun-light during mornings keep the chicks busy by feeding lucerne and white ants, so that they have no time to think of starting the mischief, which is often due to mere exuberance of energy. Coccidiosis (bloody diarrhœa) very often

breaks out in a flock of chicks when they are suddenly transferred from the brooder on to the ground. These disease organisms abound on old grounds where adult fowls which are resistant are kept running, and when young chicks are let out on such soil, they are exposed to the infection. These battery chickens have to be gradually accustomed to the soil, and hence are best placed on fresh ground or sand bare of any grass until they are ten weeks old, when they could be placed on the range.

Vegetables from Wild Plants

By

Dr. L. S. Dorasami, M.Sc. (Lond.), Ph.D. (Lond.) and K. Gopala Iyengar

The following comprises a provisional list of some wild plants, commonly occurring in Mysore, portions of which are used as vegetables:—

Name	Portion of the plant used	Kannada name
	Amarantaceæ	
Amarantus caudatus	Leaves and shoots	ಚಿಲಿಕೆ ಸೊಪ್ಪು
A. fasciatus	Do.	ಚಿಲಕರ ಸೊಪ್ಪು
*A. oleraceus**	Do.	ಹರಿವೆ ಸೊಪ್ಪು
*A. polygamus**	Do.	ದೊಗ್ಗಲಿ ಸೊಪ್ಪು
A. spinosus	Do.	ಮುಳ್ಳುದಂಟು, ಮುಳ್ಳುಹರಿವೆ ಸೊಪ್ಪು
A. tristis	Do.	ಚಿಲಿಕೆ ಸೊಪ್ಪು
A. virdis	Do.	
	Anacardiaceæ	
Spondias pinnata	Green fruit	ಅಮಟಿ
	Araceæ	
Alocasia indica	Leaves and root stock	ಕೆಸವೆ ಸೊಪ್ಪು
Colocasia antiquorum	Leaves and tubers	ಸಾವೆಗಡ್ಡೆ, ಕೆಸವಿನ ಗಡ್ಡೆ
	Bombacaceæ	
Bombax malabaricum	Flower buds	ಬೂರಗ
	Chenopodiaceæ	
*Basella alba**	Leaves and tender shoots	ದೊಡ್ಡಬಸಲೆ ಸೊಪ್ಪು
*B. rubra**	Do.	ಕೆಂಪು ಬಸಲೆ ಸೊಪ್ಪು
Chenopodium album	Do.	ಚಕ್ಕೋತೆ ಸೊಪ್ಪು
C. ambrosiodes	Do.	ಹುಳಿ ಸೊಪ್ಪು

* Denotes escape from cultivation.

Name	Portion of the plant used	Kannada name
	Compositæ	
Spilanthes oleracea	Leaves and flower heads generally used along with other herbs	ಮರಾಟ ಮೊಗ್ಗು
	Convolvulaceæ	
Evolvulus alsinoides	Shoots generally used along with other herbs	ವಿಷ್ಣುಕ್ರಾಂತಿ
Ipomea reptans	Leaves, tender shoots and roots	ಗೊಟ್ಟಗೆಡ್ಡೆ
	Cucurbitaceæ	
Bryonopsis laciniosa	Leaves	ಶಿವಲಿಂಗಿ
Cephalandra indica	Green fruit	ತೊಂಡೆಬಳ್ಳಿ
Cucumis trigonus	Do.	ಬುಡಮೆಗಿಡ
	Dilleniaceæ	
Dillenia indica	Fruit	ಬೆಟ್ಟದ ಕಣಿಗಲು
D. pentagyna	Flower buds and green fruit	ಕಾಡು ಕಣಿಗಲು
	Dioscoreaceæ	
Dioscorea aculeata	Tubers	ಕಾಡುಗೆಣಸು
D. alata	Do.	ದೊಡ್ಡಗೆಣಸು
D. pentaphylla	Tubers. Leaves are also used in times of famine	ಮುಳ್ಳುಗೆಣಸು, ಕಾಡುಗೆಣಸು
	Euphorbiaceæ	
Antidesma bunias	Leaves	ಕರಿಕೊಮ್ಮೆ
A. diandrum	Do.	ಬಿಳಿಕೊಮ್ಮೆ
Emblica fischeri	Green fruit	ನೆಲ್ಲಿ
E. officinalis	Do.	ಕಿರುನೆಲ್ಲಿ
	Ficoideæ	
Mollugo pentaphylla	Tender shoots	ಪರ್ಪಾಟಕ ಸೊಪ್ಪು
	Geraniaceæ	
Oxalis corniculata	Shoots	ಪುಲ್ಲಂಪುರುಚಿ
	Gramineæ	
Bambusa arundinacea	Tender shoots	ಹೆಬ್ಬಿದರು

Name	Portion of the plant used	Kannada name
	Guttiferæ	
Garcinia cambogia	Fruit	ಆರದಳದ ಮರ, ಮಾಂಧುಳಿ
G. xanthochymus	Do.	ದೇವಗರಿಗೆ
	Leguminosæ	
Acacia arabica	Tender pods	ಕರಿಜಾಲಿ, ಗೊಬ್ಬಿ
A. concinna	Leaves	ಶೀಗೆ
A. leucophlœa	Pods	ಬಿಳೀಜಾಲಿ, ನಾಯಿಬೇಲ
Bauhinia malabarica	Leaves	ಬಸವನಪಾದ
B. purpurea	Flowers and flower buds	ಕಂಚಿವಾಳ
B. recemosa	Tender leaves	ಕಾರಾಚ
B. tomentosa	Do.	ಕಂಚಿನಗಿಡ
B. variegata	Tender leaves and flower buds	ಬಿಳೀಕಂಚಿವಾಳ
Erythrina indica	Tender leaves	ಹಾಲಿವಾಣ
E. suberosa	Do.	ಹಾಲುವಾಣ, ಮುತ್ತುಗ
Poinciana elata	Do.	ಸುಂಕೇಸರಿ, ಸಣ್ಣಕಟ್ಟ, ವಾತನಾರಾಯಣ
Tamarindus indica	Tender leaves, flowers and green fruit	ಹುಣಸೆ
	Malvaceæ	
Hibiscus cannabinus	Tender leaves	ಪುಂಡರೀಕ
	Meliaceæ	
Melia azadirachta	Flowers	ಬೇವು
	Nyctagineæ	
Bœrhaavia diffusa	Young shoots	ಬಿಳ್ವರಗ
	Nympheaceæ	
Nelumbum speciosum	Roots, stalks of leaves and receptacles of flowers	ತಾವರೆ
	Pandanaceæ	
Pandanus odoratissimus	Floral leaves	ಕ್ಯಾದಗೆ, ಕೇತಕಿ
	Polygonaceæ	
Rumex vesicarius	Leaves and tender shoots	ಚುಕ್ಕಿಸೊಪ್ಪು

Name	Portion of the plant used	Kannada name
	Portulacaceæ	
Portulaca oleracea	Leaves and tender shoots	ದೊಡ್ಡಗೋರೆ
P. quadrifida	Do.	ಹುಳಿಬಚ್ಚಲಿ
	Rutaceæ	
Aegle marmelos	Fruit	ಬಿಲ್ವಪತ್ರೆ
Feronia limonia	Do.	ಬೇಲ
Murraya kœnigi	Leaves	ಕರಿಬೇವು
	Sapotaceæ	
Bassia latifolia	Fleshy parts of the flower	ಕಾಡು ಇಪ್ಪೆ
B. longifolia	Do.	ಇಪ್ಪೆ
Sideroxylon tomentosum	Fruit	ಕುಂಪೊಳಿ, ಪುಡಿಗೊಲ್ಲ
	Solanaceæ	
Solanum indicum	Green fruit	ಮುಳ್ಳು ಸೊಂಡೆ
S. nigrum	Leaves and tender shoots	ಕಾಚಿ ಸೊಪ್ಪು
S. torvum	Green fruit	ಸುಂಡೆ
S. trilobatum	Leaves	ಕಾಕಮುಂಚಿ ಕಾಯಿ
S. xanthocarpum	Green fruit	ರಾಮಗುಳ್ಳಕಾಯಿ
	Umbelliferæ	
Hydrocotyle asiatica	Leaves sparingly used with other herbs	ಒಂದೆಲಗ
Peucedanum graveolens	Leaves	ಕುಪ್ಪಿಸೊಪ್ಪು
	Urticaceæ	
Artocarpus hirsuta	Green fruit	ಹೆಬ್ಬಲಸು
A. integrifolia	Do.	ಪಲಸು
A. lakoocha	Do.	ಒಂಟಮರ, ವಾಟ
Ficus infectoria	Tender shoots	ಬಸರಿ, ಕರೆಬಸರಿ
F. glomerata	Green fruit	ಅತ್ತಿ
	Violaceæ	
Ionidium suffruticosum	Tender shoots sparingly used with other herbs	ಪುರುಷರತ್ನ

Costs of Cultivation

A few costs of cultivation collected by the Officers of the Agricultural Department are presented here. They are useful in obtaining a business view of the crops dealt with.

1. Sugarcane

N.B.—The cost of fertilizers fluctuates according to market rates.

		Rs.	A.	P.
(*A*)	*Preparatory Cultivation.*—			
1.	Flooding the field for ploughing, 2 coolies at 5 annas a day for 1 day	0	10	0
2.	First ploughing with improved plough, 2 pairs of bullocks at Rs. 1-8-0 per pair a day for 1 day ..	3	0	0
3.	Cost of 15 cart-loads of farm-yard manure or compost at Re. 1 per cart-load	15	0	0
4.	Spreading manure, 8 women at 3 annas a day for 1 day	1	8	0
5.	Cross ploughing 3; 4 pairs at Rs. 1-8-0 per pair per day	6	0	0
6.	Working cultivator, 1 pair at Rs. 1-8-0 per pair per day	1	8	0
7.	Opening furrows, irrigation channels; 1 pair for 1½ days at Rs. 1-8-0 per day	2	4	0
8.	Trimming irrigation channels and furrows, 4 male coolies at 5 annas a day for 1 day	1	4	0
9.	Sugarcane setts 10,000 at Rs. 2-8-0 per 1,000 ..	25	0	0
10.	Fertilizers at planting, 1 cwt. concentrated supers, 2 cwt. ammonium sulphate	30	0	0
11.	Mixing and distributing the fertilizers, 6 boys or girls at 3 annas each and 1 male adult cooly at 6 annas a day	1	8	0
12.	Spreading cane setts on the ridges, 10 girls or boys at 3 annas each, 2 male coolies at 5 annas each for a day	2	8	0
13.	*Planting*:—			
	(*a*) Preparatory irrigation, 2 boys at 3 annas each a day	0	6	0
	(*b*) Planting, 8 girls at 3 annas each	1	8	0
14.	Weeding, 15 coolies at 3 annas each	2	13	0
15.	Intercultivation and light earthing up, 1 pair of bullocks for 1 day at Rs. 1-8-0	1	8	0
16.	Making irrigation channels in the cane field, a pair of bullocks for ½ day at Rs. 1-8-0 per day ..	0	12	0
17.	Repairing irrigation channels, 2 male coolies for 1 day at 5 annas each	0	10	0

		Rs.	A.	P.
18.	Application of second dose of Amm. Sulphate, 3 cwts. (at the end of 4 weeks after planting), cost of fertilizer	30	0	0
	Labour for application, 2 male coolies at 5 annas each, 6 girls at 3 annas each for 1 day	1	12	0
19.	Application of third dose of Amm. Sulphate 3 cwt. (between eighth and tenth week after planting), cost of fertilizer	30	0	0
	Labour for application of same as above	1	12	0
20.	*Final earthing up*:—			
	(*a*) Light ploughing between rows of cane, 2 pairs of bullocks at Rs. 1-8-0 per day for 1 day	3	0	0
	(*b*) Ridger plough—2 pairs of bullocks for ½ day at Rs. 1-8-0 per day	1	8	0
	(*c*) Extra cooly for assistance at 5 annas a day ..	0	5	0
	(*d*) Labour for making zig-zag channels and mending irrigation channels, 8 male coolies at 5 annas a day for one day	2	8	0
21.	*Irrigation*:—			
	February—7 irrigations, 2 boys at 3 annas each per day per irrigation	2	10	0
	March—7 Do. do. do. ..	2	10	0
	April—7 Do do. do. ..	2	10	0
	May—4 irrigations after zig-zagging, 1 male cooly at 5 annas a day per irrigation	1	4	0
	June—4 Do. do. do. ..	1	4	0
	July—4 Do. do. do. ..	1	4	0
	August—2 Do. do. do. ..	0	10	0
	September—3 Do. do. do. ..	0	15	0
	October—2 Do. do. do. ..	0	10	0
	November—3 Do. do. do. ..	0	15	0
	December—4 Do. do. do. ..	1	4	0
	January—5 Do. do. do. ..	6	9	0
	February—6 Do. do. do. ..	1	14	0
	March—6 Do. do. do. ..	1	14	0
	Total number of irrigations—64.			
	Harvesting cane, the yield being estimated at 30 tons per acre—at annas 12 per ton of cane	22	8	0
	Transporting cane to the weigh bridge at Re. 1 per ton	30	0	0
	Assessment	12	0	0
	Interest on land value or rent	15	0	0
	Unforeseen—for rounding	6	11	0
	Total ..	276	0	0
	Cost of production of sugarcane per ton ..	9	0	0

		Rs.	A.	P.
	2. Tobacco as an Irrigated Crop			
1.	Ploughing with improved plough: two ploughings at Re. 1 per ploughing	2	0	0
2.	Farm-yard manure: 10 carts at As. 8 a cart .. (Price may often go up to Re. 1-0-0 per cart.)	5	0	0
3.	Applying farm-yard manure: 4 coolies for half a day at As. 3 a cooly per day	0	6	0
4.	Cultivating with six-shovel cultivator	1	0	0
5.	Levelling	1	0	0
6.	Furrowing: half a day at Re. 1 per pair per day ..	0	8	0
7.	Cost of fertilizers	25	0	0
8.	Applying fertilizers: 6 coolies for half a day at As. 3 a cooly per day	0	9	0
9.	Irrigation at planting: 3 coolies for one day at As. 4 a cooly per day	0	12	0
10.	Cost of 6,000 seedlings at Re. 1-8-0 per 1,000 ..	9	0	0
11.	Transplanting: 6 coolies at As. 3 each a day ..	1	2	0
12.	Eight irrigations at 2 coolies per irrigation at As. 4 a day each	4	0	0
13.	Gap filling: one cooly for one day at As. 4 per day ..	0	4	0
14.	Intercultivation: two pairs at Re. 1 per pair ..	2	0	0
15.	Primming: six coolies at As. 3 each	1	2	0
16.	Picking: 8,000 lbs. of leaf at Re. 1 per 1,000 lbs. (upto 25 per cent. of expenses under this head may go for topping and suckering carried on simultaneously) ..	8	0	0
17.	Carting to barns at As. 8 a 1,000 lbs. for 8,000 lbs. ..	4	0	0
	Total ..	65	11	0
	Gross return at As. 8 a maund of 25 lbs. for 8,000 lbs. of Green Leaf	160	0	0
	Deduct cultivation charges	65	11	0
	Net return per acre ..	94	5	0

3. Paddy

First ploughing with country ploughs: two pairs of bullocks with men at As. 12 per pair	1	8	0
Sowing green manure seeds: cost of 5 seers of green-gram or black-gram, 5 seers of horse-gram and 2 seers of sunhemp ..	1	0	0
Cost of covering the seed with country plough—1 pair ..	0	12	0
Second ploughing after the water is received in the channel: two pairs at As. 12 a pair	1	8	0
Trimming and re-laying bunds: six men at As. 6 each	2	4	0

	Rs.	A.	P.
Ploughing and levelling: two and one-fourth pairs at As. 12 a pair	1	11	0
Cost of cattle manure including cost of application	10	0	0
Cost of 32 seers of seed at 1 anna a seer	2	0	0
Cost of raising the nursery till the time of transplantation ..	2	0	0
Ploughing at time of transplanting, 1 pair	0	12	0
Transplantation including levelling the fields with *mumties*, pulling out seedlings, carrying them to the plots and transplanting: 2 men at As. 6 and 9 women at As. 5	3	9	0
Irrigation throughout the growing period: 80 seers of paddy or Rs. 5.	5	0	0
Weeding: 6 women coolies at As. 4 per head	1	8	0
Preparing the threshing floor: 1 man at As. 6	0	6	0
Harvesting: 6 men at 1 kolaga of paddy each or As. 8 each ..	3	0	0
Carrying and threshing: 6 men at 1 kolaga of paddy each or As. 8 ..	3	0	0
Trampling paddy straw and winnowing the trampled stuff: 4 men at 1 kolaga of paddy each or As. 8 each	2	0	0
Bundling and stocking paddy straw, at Re. 1-4-0 per 100 bundles ..	2	8	0
Wear and tear: cost of 2 country ploughs	4	0	0
Total ..	48	6	0
Yield.—Cost of 100 seers of green-gram or black-gram ..	10	0	0
Cost of 10 candies or 16 pallas of paddy at Rs. 10 per candy	100	0	0
Cost of 200 bundles of straw at Rs. 10 per 100 bundles	20	0	0
Total ..	130	0	0
Income per acre ..	81	10	0
Assessment, cess, etc. ..	10	0	0
Net income per acre ..	71	10	0

4. Potato

Cost of Cultivation of Potato as an Irrigated Crop

1. Digging the land: 40 men at As. 5 per man	12	8	0
2. Breaking clods and picking weeds: 5 men and 10 women at As. 5 and As. 3 per head respectively	3	7	0
3. Levelling the land with a cultivator and levelling plank: one pair of bullocks	0	12	0
4. Town manure (nightsoil and other house sweepings), at Rs. 2 per cart-load: 20 cart-loads	40	0	0
5. Levelling, preparation of beds, water channels, etc.: 4 men and 10 women	3	2	0
6. Cost of seed potatoes at Rs. 3 per md.: 30 mds. ..	90	0	0

		Rs.	A.	P.
7.	Application of manure to beds: 10 women and 2 men ..	2	8	0
8.	Cutting of tubers: 8 women and 4 men	2	12	0
9.	Irrigation of the plot by *picottah* or *kapile*	2	0	0
10.	Planting of tubers: 15 women and 5 men	4	6	0
11.	Irrigation for 3 months: 30 irrigations at Rs. 2 per irrigation	60	0	0
12.	Three weedings: 10 women per weeding	5	10	0
13.	Three earthings: 10 women per earthing	5	10	0
14.	Digging and picking of tubers: 5 men and 15 women ..	4	6	0
15.	Collecting the tubers and heaping them in shade: 10 women and 2 men	2	8	0
16.	Turning over the heap and picking damaged tubers: 8 women at As. 3 for each turning	4	8	0
	Total ..	244	1	0
	Gross Yield at 300 mds. per acre at Re. 1-4-0 per md. ..	375	0	0
	Net profit	130	15	0

The yield may go up to 400 maunds and price per maund may come down to As. 12 as noted in the article on Potatoes in this issue. Assessment, cess, etc., have to be added to the cost of cultivation noted here.

5. Turmeric

Cost of Cultivation of Turmeric in Goribidanur Taluk

1.	Flooding of land for ploughing	1	8	0
2.	Ploughing the land 4 times with improved plough	6	0	0
3.	Farm-yard manure, and application of manure: 20-30 cart-loads at As. 12 per cart-load	22	8	0
4.	Levelling and breaking of clods and picking weeds: 4 men and 8 women	2	12	0
5.	Opening of furrows, water channels, etc., with country plough	0	12	0
6.	Trimming of beds, water channels: 2 men and 3 women ..	1	9	0
7.	Seed turmeric: 40 mds. at Re. 1 per md.	40	0	0
8.	Planting: 10 females at As. 3 each	1	14	0
9.	Weeding and earthing up of rows—3 weedings: 10 women each weeding	5	10	0
10.	Cost of tree castor seed, garden togari and radish, both for shade and catch crop	3	0	0
11.	Total irrigations for 10-month period: about 30 irrigations at Rs. 1-8-0 per irrigation	45	0	0
12.	Digging, picking and cleaning of the rhizomes: 10 men and 15 women	5	15	0
	Total ..	136	8	0

	Rs.	A.	P.
Gross Yield—			
Turmeric 400 mds. at As. 8 a md. ..	200	0	0
Castor 50 seers	5	0	0
Green togari 30 seers	4	0	0
Radish 1 cart-load	10	0	0
Total ..	219	0	0
Net Profit	83	0	0

Deduct assessment, etc.

6. Chilly

Cost of Cultivation for Rainy Season Chilly Crop at Goribidanur

1.	Ploughing of the land with country plough for 2 days at As. 8 per day	1	0	0
2.	Ploughing of the land with K.M. plough for 4 ploughings at Re. 1 per ploughing	4	0	0
3.	Sheep folding for 8 nights at 1,000 sheep a day at Rs. 2 per day	16	0	0
4.	Working Halube or cultivator, 2 times at Re. 1 per day ..	2	0	0
5.	Collecting weeds turned over by Halube or cultivator: 4 females at As. 3 each	0	12	0
6.	Cost of 20 cart-loads of sheep manure at Rs. 2 per cart-load ..	40	0	0
7.	Opening of furrows 2 feet apart with water channels, etc.: 4 men and 6 women at As. 5 and As. 3 respectively ..	2	6	0
8.	Application of sheep manure to rows: 2 men and 6 women ..	1	12	0
9.	Trimming of the furrows and irrigation channels: 8 females and 2 males	2	2	0
10.	Cost of chilly seedlings at Re. 1 a bed of four beds	4	0	0
11.	Irrigation of the land before transplanting the seedlings: 2 pairs of bullocks, 2 male coolies and 4 female coolies ..	3	6	0
12.	Transplanting of the seedlings: 2 male coolies and 10 female coolies	2	8	0
13.	First weeding 20 days after planting: 10 female coolies ..	1	14	0
14.	Inter-cultivation with kunte: 1 pair for 1 day	0	12	0
15.	Cost of groundnut cake at 40 lbs. per acre	40	0	0
16.	Application of powdered cake: 4 males and 10 females ..	3	2	0
17.	Earthing up of rows with ridger plough at Rs. 1-8-0 ..	1	8	0
18.	Irrigation of the crop from September to November depending on the rainfall: 6 irrigations at Rs. 2 per irrigation ..	12	0	0
19.	Irrigation of the crop from November to April at 1 irrigation per week: 24 irrigations at Rs. 2	48	0	0
20.	Harvesting of the crop at different intervals: 6 times during the cropping time (picking of fruits only), at 12 coolies per time	13	8	0
21.	Drying of the fruits, watching of the crop, etc.	5	0	0
	Total ..	205	10	0

	Rs.	A.	P.
Yield of dry chillies per acre: 100 mds.			
At the present market rate of Rs. 3-8-0 per maund, the gross income for 100 maunds is	350	0	0
Cost of cultivation	205	10	0
Net income ..	144	6	0

Deduct assessment, cess, etc.

QUERY COLUMN

What is *Nageru* ?

Nageru among cattle is a malady very much akin to gloss Anthrax, wooden tongue, etc. But the latter diseases are caused by specific organisms. But *Nageru* is a symptom exhibiting severe congestion and engorgement of the veins of the tongue and mouth. These symptoms are secondary to acute impaction or flatulence of the rumen or first stomach. This condition among ruminants is caused by errors in feeding. Therefore the causes are to be discovered and avoided to prevent its occurrence. The general line of treatment to rectify the condition, is to administer a gastric stimulant together with a mild purgative.

The cruel practice of blood-letting by puncturing the engorged vein under the tongue is uncalled for. Therefore this irrational treatment has to be discouraged.

The following recipe has proved satisfactory in such disorders:—
Adult Cattle—

R/ Dl. Lini—X oz.
Ammon. Carb.—IV drs.
Ol. Turpentine—IV drs.
Tr. Nux Vomica—II drs.
Tr. Ginger—II drs.

Add ten ounces of *aqua Menth pip.* to the above and shake well before use. Half mixture to be given twice a day.

R/ Mag. Sulph.—VIII oz.
Sod. Chloride—VIII oz.
Soda Bi-carb.—Half oz.
Soda Ginger—IV drs.
Pul. Ginger—IV drs.
Pul. Asafœtida—II drs.
Pul. *Ajowan*—II drs.
Pul. Gentian—II drs.
Mft. Pul.—I dr.

Half to be given twice a day in a pint of warm water after dissolving well.

—S. D. A.

SELECTIONS, ABSTRACTS AND EXTRACTS

On the Oxygen Supply of Rice Roots

(M. H. Van Raalte)

During the greatest part of its vegetation period lowland rice grows submerged. The soil in which the roots thrive, is almost continuously in a water-logged condition, and oxygen is accessible to the organisms of the soil in the dissolved state only.

Diffusion of dissolved oxygen proceeds much slower than in the gaseous state and, as this substance is rapidly consumed by the organisms in the superficial soil layers, the environment of rice roots contains hardly any oxygen. Thus, under normal conditions, there is no oxygen supply from the soil to the roots and the question may arise in which way the roots are able to obtain this substance.

From the experiments conducted in this regard the following conclusions are drawn:—

In a normal rice plant oxygen penetrates the areal parts and is transported to the roots. By this transport, the roots are capable of living in a medium which is nearly completely devoid of oxygen.

The roots are able to absorb gaseous oxygen as well as such, which has been dissolved in the water of the medium. Direct absorption from the air by the roots seems not to be of much importance in normal plants. This might change, however, if under pathological conditions, the normal supply of oxygen has been disturbed. In this case the draining off the water from the field might have the effect of preventing the oxygen tension in the root to decrease.

Absorption of oxygen from the soil water may occur in the following way. A full-grown rice plant transpires at a rather high rate. By this, considerable quantities of water are everyday withdrawn from the soil. These are replaced by water from the surface layers on the field. Thus fresh water is constantly penetrating the upper layer of the soil. As the surface of the soil often is covered by algæ, this water will be saturated with oxygen, at least during the day-time. When it comes into contact with the basal parts of the roots, more or less of the dissolved gas may be absorbed. Whether this process plays an important part in the oxygen supply to the roots can only be determined in experiments under field conditions.

1. In the air spaces of the root cortex oxygen is present, even if the surrounding medium is devoid of it.
2. The oxygen content differs not significantly in roots of various varieties investigated.
3. A transport of oxygen takes place from the aerial parts of the plant to the roots.
4. The oxygen tension in the roots is not increased by photosynthesis.
5. Oxygen can penetrate into the roots through the outer cell layers.

—Extracted from the "Annals of the Botanic Gardens" (Java),
Vol. 51, Part 1, Aug. 1941.

A Method for Conversion of Cocoanut Oil into Solids

The mere heating of cocoanut oil for from 5 to 20 hours in the neighbourhood of 300° C. in an experiment resulted in 14 to 22 per cent. conversion into a solid compound of unknown composition. By a later method, using ferric oxide or finely divided iron, both of which were found to work equally well, it was observed that a much higher degree of conversion could be obtained at a greatly reduced reaction time. The process consisted in using an ordinary 150-ml. distilling flask, with a low side tube, an air condenser, a receiver and two burners, placing a charge of a 100-ml. ordinary cocoanut oil and one gram of catalyst in the flask; heating to boiling and distilling. Two distillates are obtained; the first portions being liquid and a second portion which solidifies when received on a cold plate. Two processes may be adopted, one, batch process, in which quantities of oil are placed in the flask each time separately for distillation and the second, continuous process, in which oil is continuously fed into the flask by a dropping funnel. Distillation must be fast—3 to 4 drops a second or faster—and the oil charged must be water-free; preferably dried at 110° C. The distillate obtained is dark yellowish, with a bluish flourescence and sets to a crystalline greenish yellow mass on cooling.

The crystals are separated from the liquid by suction filtration, being treated in alcohol successively and recrystallised till a perfectly white product is obtained. The purified crystals may be air-dried, giving a white crystalline powder or melted and cast into sticks. The purified product is a light, white crystalline powder, tasteless, with a faint odour, similar to stearic acid. It melts sharply at 55° C. to a clear, transparent, colourless liquid and solidifies to a hard rather brittle, crystalline solid. It is soluble in ether, chloroform, kerosene and acetone, but sparingly so in cold 95 per cent. ethyl alcohol. It is chemically neutral remaining unaffected by three-hour boiling with 3N alcoholic KOH, or concentrated HNO_3 and HCl, but dissolves in concentrated H_2SO_4 to a dark liquid. It absorbs bromine in chloroform, so slowly as to make the reaction appear doubtful; owing to its close resemblance to paraffin, the solid may possibly be used interchangeably with the latter, as for example, in candle-making. One hundred grams of oil have experimentally yielded 47·7 to 64·4 gms. of solid.

—Julian Banzon, in *The Philippine Agriculturist,*
Vol. XXVI, No. 5, October 1937, pp. 399-402.

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